

S/N 09/887,412

Amendment in Response to Office Action Dated 7/16/2003

AMENDMENTS TO THE CLAIMS

Please amend the claims of the present application as set forth below. In accordance with the PTO's revised amendment format, changes are shown by strikethrough (for deleted matter) or underlining (for added matter).

Claims 1-22 were originally filed.

Claims 1-11, 13, 15, and 16 have been amended.

Claims 23-30 have been added.

Accordingly, claims 1-30 are pending in the application.

1. (Currently Amended) A method comprising:

generating a mesh grid representation of uncovered surfaces of an the object, the mesh grid including at least one grid element;

simulating hair by associating at least one seed with ~~in~~ each of the grid elements element; and

sampling generating the hair in such a manner that at least one hair extends from each seed, at least a portion of the hair extending beyond a plurality of boundaries of the grid element into a volume texture on a per-grid element basis.

2. (Currently Amended) A method according to claim 21, further

comprising:

parameterizing a texture in each of the grids.

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3. (Currently Amended) A method according to claim 32, wherein parameterizing the texture comprises:

identifying one or more interactive control and/or viewing parameters associated with each grid element of the mesh grid ~~which~~ to determine, at least in part, ~~what~~ which grid elements of the surface detail model are used to render surface detail in that grid element.

4. (Currently Amended) A method according to claim 43, further comprising:

generating a shell texture model for each grid element of the mesh based, at least in part, on the parameterization of the grid elements.

5. (Currently Amended) A method according to claim 1, wherein developing a surface detail model comprises:

generating a shell texture model for each element of a dynamically generated grid element representation of uncovered surfaces of an object.

6. (Currently Amended) A method according to claim 65, wherein generating a texture model comprises:

~~generating a mesh grid representation of uncovered surfaces of the object;~~

simulating at least one hair in each of the grid elements; and

~~sampling~~ generating the at least one hair into a volume texture on a per-grid element basis.

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7. (Currently Amended) A method according to claim 76, further comprising:

utilizing the volume texture to generate semi-transparent concentric shells of the volume texture, which are layered over select areas of the object surface.

8. (Currently Amended) A storage medium comprising a plurality of executable instructions which, when executed, implement a modeling agent to develop a surface detail model that includes a mesh grid representation made from at least one mesh grid element, the surface detail model utilizing ~~utilizing at a modeling technique that associates at least one seed with the mesh grid element, the at least one seed being located in each mesh grid element, at least one hair extending from each seed so that at least a portion of the hair extends in a direction that has a perpendicular component to a plane formed by the mesh grid element, and to render the modeling technique renders~~ surface detail in accordance with the developed surface detail model over an object surface.

9. (Currently Amended) A storage medium according to claim 8, wherein the modeling agent generates a mesh grid representation of uncovered surfaces of the object, simulates hair in each of the grid elements, and generates the hair into a volume texture on a per-grid element basis to develop the surface detail model, wherein at least a portion of the hair extends beyond the boundaries of the mesh grid element.

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10. (Currently Amended) A storage medium according to claim 9, wherein the instructions to implement the modeling agent further comprise instructions to parameterize a texture in each of the ~~grids~~ mesh grid elements.

11. (Currently Amended) A storage medium according to claim 10, wherein the instructions to implement the modeling agent further comprise instructions to generate a shell texture model for each grid element of the mesh grid based, at least in part, on the parameterization of the grid elements.

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12. (Original) A storage medium according to claim 10, wherein the instructions develop the surface detail model comprise instructions to generate a shell texture model for each element of a dynamically generated grid representation of uncovered surfaces of an object.

13. (Currently Amended) A storage medium according to claim 12, wherein the instructions to generate a texture model comprise instructions to generate a mesh grid representation of uncovered surfaces of the object, simulate hair in each of the grid elements, and ~~sample~~ generate the hair into a volume texture covering the grid element on a per-grid element basis.

14. (Original) A storage medium according to claim 13, wherein the instructions to implement the modeling agent further comprise instructions to utilize the volume texture to generate semi-transparent concentric shells of the volume texture, and to layer the shells over select areas of the object surface.

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15. (Currently Amended) An apparatus comprising:

a modeling agent, to develop a surface detail model utilizing a modeling technique appropriate for a given set of viewing parameters; and

a render engine, responsive to the modeling agent, to render surface detail in accordance with the developed surface detail model over an object surface, the render engine including a mesh grid representation made from at least one mesh grid element, the surface detail model associating at least one seed with the mesh grid element, the at least one seed being located in each mesh grid element, at least one hair extending from each seed in a direction that has a perpendicular component to a plane formed by the mesh grid element such that at least a portion of the hair extends outwardly from the boundaries of the mesh grid element.

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16. (Currently Amended) An apparatus according to claim 15, the modeling agent comprising:

a geometry preprocessor module, to generate a mesh grid representation of uncovered surfaces of the object, to simulate hair in each of the grid elements, and sample generate the simulated hair into a volume texture on a per-grid element basis, wherein each hair extends from a seed that is located within one grid element.

17. (Original) An apparatus according to claim 16, wherein the geometry preprocessor parameterizes a texture in each of the grid elements.

18. (Original) An apparatus according to claim 17, wherein the geometry preprocessor generates a shell texture model for each grid element of the mesh based, at least in part, on the parameterization of the grid element(s).

19. (Original) An apparatus according to claim 15, wherein the surface detail engine generates a shell texture model for each element of a dynamically generated mesh grid representation of uncovered surfaces of an object.

20. (Original) An apparatus according to claim 19, the surface detail engine comprising:

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a geometry preprocessor, to generate a mesh grid representation of the uncovered surfaces of the object, to simulate hair in each of the grid elements, and to sample generate the hair into a volume texture on a per-grid element basis.

21. (Original) An apparatus according to claim 20, the surface detail engine comprising:

a shell generator module, to utilize the volume texture and generate a at least one semi-transparent concentric ~~shell(s)~~ shell.

22. (Original) An apparatus according to claim 21, further comprising:

a memory device including a plurality of executable instructions; and

a controller, coupled to the memory device, to execute at least a subset of the plurality of executable instructions to implement the surface modeling agent.

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Please add the following new claims:

23. (New) The method of claim 1, wherein there is at least one seed contained within each mesh grid element of the mesh grid.

24. (New) The storage medium of claim 8, wherein there is at least one seed contained within each mesh grid element of the mesh grid.

25. (New) The apparatus of claim 15, wherein there is at least one seed contained within each mesh grid element of the mesh grid.

26. (New) A method comprising:

generating a mesh grid representation of uncovered surfaces of an object formed from a plurality of substantially planar mesh grid elements;

applying a plurality of surface detail seeds to each planar mesh grid element, at least one surface detail seed being located in each planar mesh grid element; and

generating surface detail elements to extend from each seed in a direction such that at least a portion of a simulated strand of hair extends outwardly from the boundaries of the planar mesh grid element.

27. (New) The method of claim 26, wherein each surface detail element includes a hair.

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28. (New) The method of claim 26, wherein each surface detail element includes a hair.

29. (New) The method of claim 26, wherein at least a portion of the surface detail element extends beyond the boundaries of the mesh grid element.

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30. (New) The method of claim 29, wherein at least one of the surface detail elements extends in a direction that is perpendicular to the planar mesh grid elements to form a life-like surface detail surface that is spaced from the mesh grid representation of the uncovered surfaces of the object.
